September 2024 Monthly Weather Report

This document provides a summary of the UK's weather and climate statistics for September 2024.

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UK overview

September saw unsettled weather across the UK, with variable temperatures and persistent showers. Northern Ireland and Scotland experienced a relatively dry and sunny month, while central and southern parts of the UK were particularly wet and dull. The month began on a warm note, with above average temperatures across the UK persisting for the first week as successive plumes of warm, humid air were drawn northwards off continental Europe. However, by the 11th the temperatures dropped as Arctic air moved in. The third week saw temperatures again above average, before a return to much cooler conditions in the final week of the month. It was also a very wet month for many: the first few days of September saw heavy, widespread showers across the country as well as thunderstorms in the southwest. On the 13th, generally fair conditions overnight coincided with visible Aurora in northern regions. High pressure to the northeast of the UK brought a period of settled weather on the 16th, but low pressure soon returned and allowed scattered heavy showers and thunderstorms to develop across southern and central England and Wales during the afternoon. Frontal systems brought bands of heavy and often slow-moving rain to parts of southern England, Wales and central England, while scattered showers brought rain to Scotland and Northern Ireland.

Overall, September saw below average temperatures, with a provisional mean of 12.7°C (anomaly -0.3°C). Temperatures were slightly lower in Scotland and Northern Ireland than in southern and central England. East Anglia saw mean temperatures around 0.5°C above average, while eastern Scotland recorded temperatures around 0.7°C below average. Rainfall for the UK overall was slightly above average (provisional anomaly 125%), but there was strong regional variation, with southern England provisionally recording 233% of their average rainfall while Scotland recorded just 63%. Several counties including Bedfordshire, Gloucestershire and Oxfordshire provisionally recorded their wettest September on record, with over 300% of the average September rainfall. Southern England recorded its third wettest September on record, and its wettest since 1918. Several stations including Woburn (Bedfordshire) and Shawbury (Shropshire) provisionally experienced new record daily rainfall accumulations. Sunshine duration was below average for the UK overall for September (anomaly 96%), although Scotland and Northern Ireland both experienced above average sunshine durations. Wales and southern England recorded around 80% of the average sunshine duration in September.

Reference climatology used for calculating anomalies is the period 1991-2020 unless otherwise stated.

Weather impacts

- **Thunderstorms at the start of the month caused flooding and travel disruptions in England and Wales**
- **Later in the month, heavy and persistent rainfall in central and southern parts of England led to surface water flooding, power outages, and travel disruptions**

September saw a big contrast in weather fortunes across the UK, with Scotland and Northern Ireland experiencing a relatively dry and sunny month while central and southern parts of the UK were wet and dull.

The first eight days of September saw successive plumes of warm, humid air drawn northwards off continental Europe into the UK, with southern parts of England and Wales the most affected. Surface water flooding along the rail line between Shrewsbury and Machynlleth on the 2nd led to travel disruption, and there were reports of road and property flooding in the Midlands and Herefordshire. From the 5th to the 8th, low pressure sat just to the south of the UK and the focus for the heavy downpours and impacts was across southern Wales and southern England as bands of heavy, thundery rain moved westwards. On the 5th there was localised flooding in Hampshire, while the 6th saw reports of surface water flooding on roads around Newport. The overnight period between the 6th and 7th was particularly busy for firefighters around Swansea, Port Talbot, Cardiff and Newport with reports of road and property flooding. Localised power outages were also reported in Port Talbot. On the 8th, further widespread downpours and thunderstorms developed with surface water flooding reported from several locations including Shrewsbury and the Isle of Wight, where a pony was killed by a lightning bolt. In Surrey, power outages from lightning strikes were reported as impacting the water supply to as many as 1300 properties.

The week from the 12th to the 19th saw high pressure across the UK and largely settled, warm conditions. However, a change began on the 20th as pressure began to fall across southern areas, although high pressure retained its influence further north. Heavy showers and thunderstorms first developed on the 20th and then more widely on the succeeding days with a spell of more persistent and often heavy rain affecting parts of the Midlands and southern England on the 23rd. On the 20th, surface water flooding was reported from Sussex to Gloucestershire, with some leisure centres, schools and recycling centres forced to close due to flooding. A section of Cheltenham General Hospital reported water pouring through the ceiling after a torrential downpour. Activity on the 21st was focussed more across the north and east Midlands with houses in Stoke-on-Trent and Derby reportedly struck by lightning. Across Nottinghamshire and Leicestershire the storms caused significant power outages, and several Nottinghamshire motorists were reportedly rescued from their vehicles after becoming trapped in floodwater. Southern Midlands and southern England

bore the brunt of the impacts on the 22nd, with Dunstable High Street reported flooded, at least two properties in Northamptonshire reportedly struck by lightning, and numerous incidents of surface water flooding as well as the first reports of river flooding from Bedfordshire. After the persistent rain on the 23rd, it was reported that around 250 properties were reported to have been flooded, the majority of these within Hertfordshire, Bedfordshire, and Northamptonshire. Numerous flood warnings were issued with several sites recording in excess of 100mm of rain just on the 23rd alone. The Billing Aquadrome caravan park in Northamptonshire was reported to have been precautionarily evacuated with around 1000 people involved, and the A421 in Bedfordshire was closed for an extended period due to the conditions.

On the 25th and 26th, another bout of widespread rainfall and some thunderstorms affected England, Wales and Northern Ireland. The West Midlands saw various impacts including surface water flooding closing major roads as well as reports of a flooded care home in Shropshire. On the 27th, a stretch of the M5 was closed due to flooding, and the village of Narborough in Leicestershire was reported as badly affected by road flooding. By the 28th, the Environment Agency was reporting that around 800 properties had suffered flood damage, with a further 11,000 under protective measures. More rain fell on the 30th across Northern Ireland and northern England, which had been spared the worst of the earlier rain, resulting in more muted impacts. However, there were still reports of road flooding and disrupted traffic, especially across Merseyside.

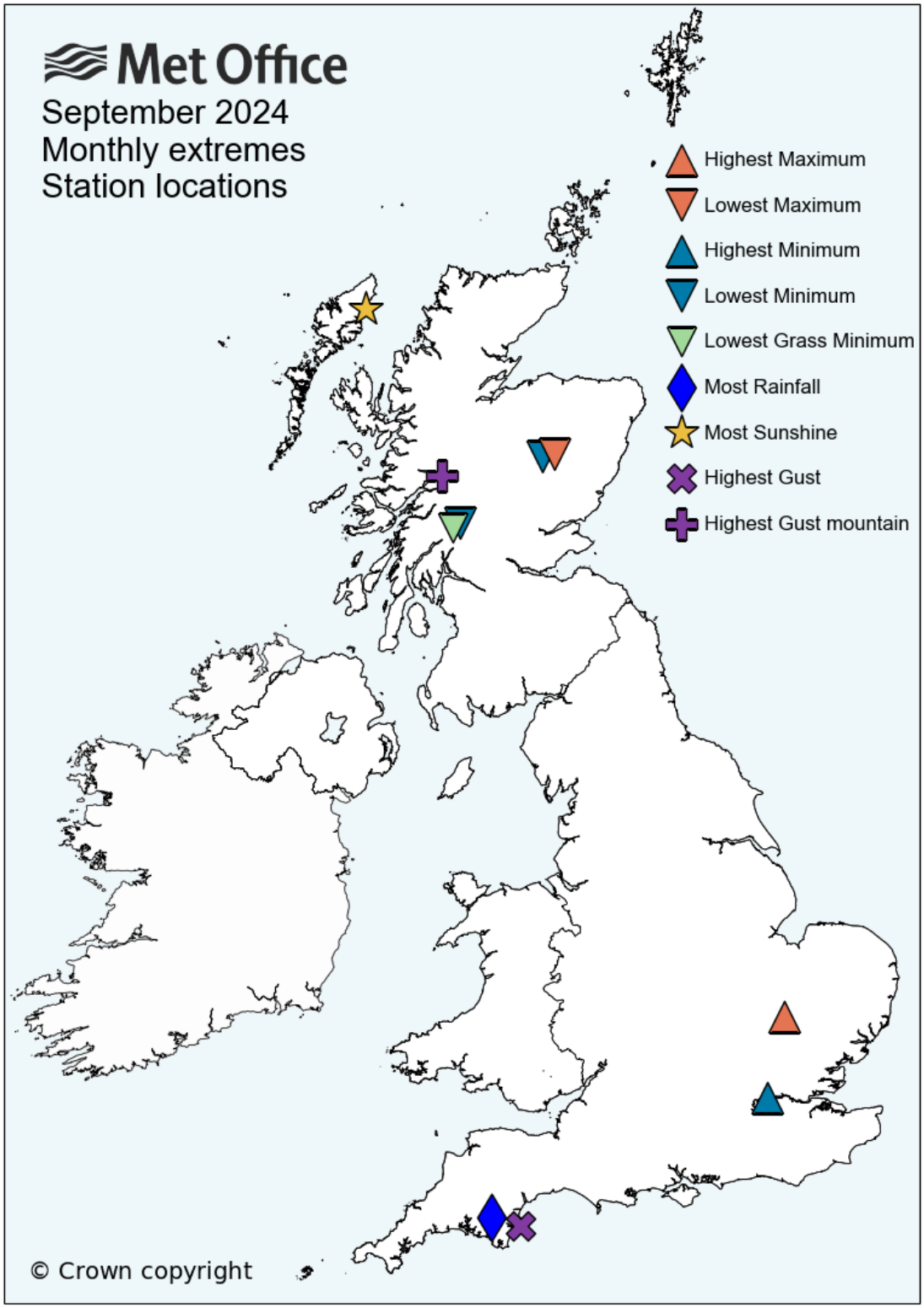
Monthly extremes

The table below lists UK monthly weather extremes recorded at individual weather stations during September 2024 from data available on 02/10/2024. The map shows the location of these stations.

Highest Maximum	**30.1°C** on **1st** at Cambridge, Botanic Garden (Cambridgeshire, 13mAMSL)
Lowest Maximum	**7.3°C** on **27th** at Balmoral (Aberdeenshire, 283mAMSL)
Highest Minimum	**18.8°C** on **2nd** at London, St James's Park (Greater London, 5mAMSL)
Lowest Minimum	**-3.0°C** on **25th** at Tyndrum No 3 (Perthshire (in Central Region), 168mAMSL) and Braemar No 2 (Aberdeenshire, 327mAMSL)
Lowest Grass Minimum	**-6.8°C** on **25th** at Tyndrum No 3 (Perthshire (in Central Region), 168mAMSL)
Most Rainfall	**119.9mm** on **29th** at White Barrow (Devon, 445mAMSL)
Most Sunshine	**12.7hr** on **5th** at Stornoway Airport (Western Isles, 15mAMSL)
Highest Gust	**60Kt 69mph** on **29th** at Berry Head (Devon, 58mAMSL)
Highest Gust (mountain*)	**88Kt 101mph** on **14th** at Aonach Mor (Inverness-shire, 1130mAMSL)
Greatest Snow Depth at 0900 UTC	No non-zero values.

mAMSL refers to station elevation in metres above mean sea level.

*Mountain stations are above 500mAMSL.


Met Office
September 2024
Monthly extremes
Station locations
Highest Maximum
Lowest Maximum
Highest Minimum
Lowest Minimum
Lowest Grass Minimum
Most Rainfall
Most Sunshine
Highest Gust
Highest Gust mountain
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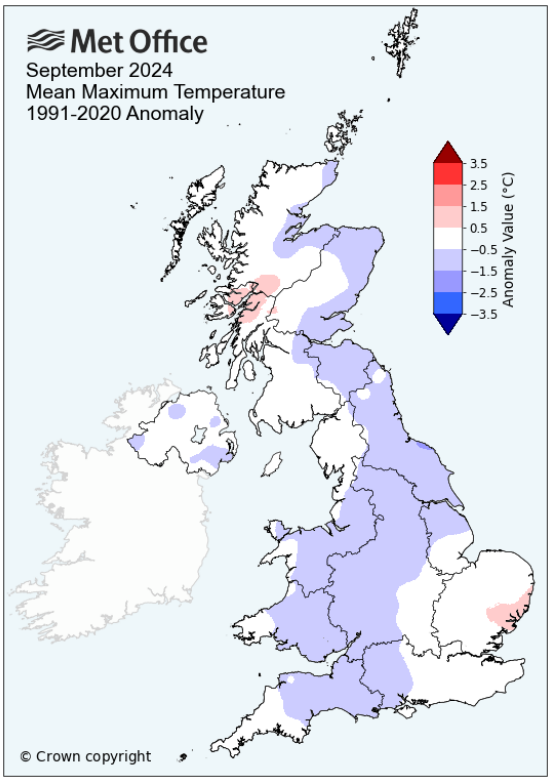
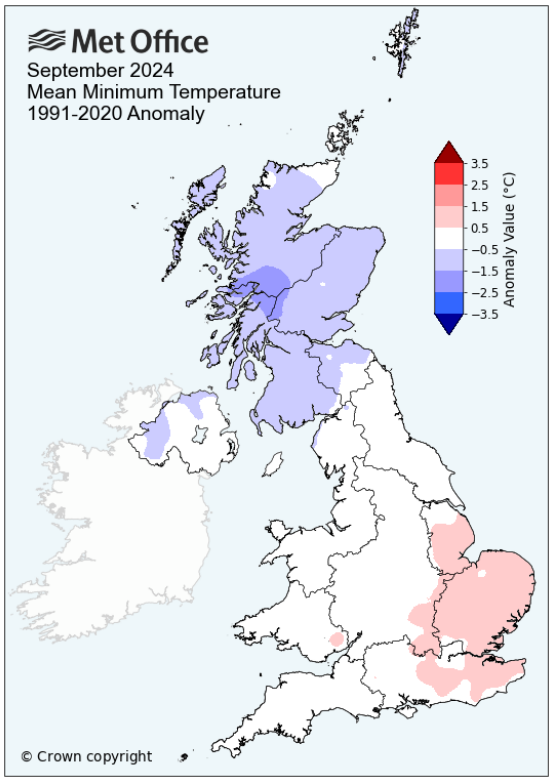
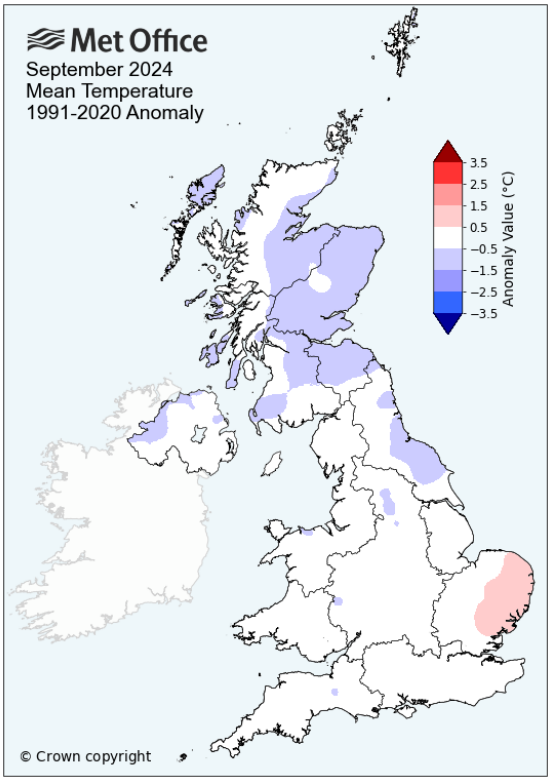
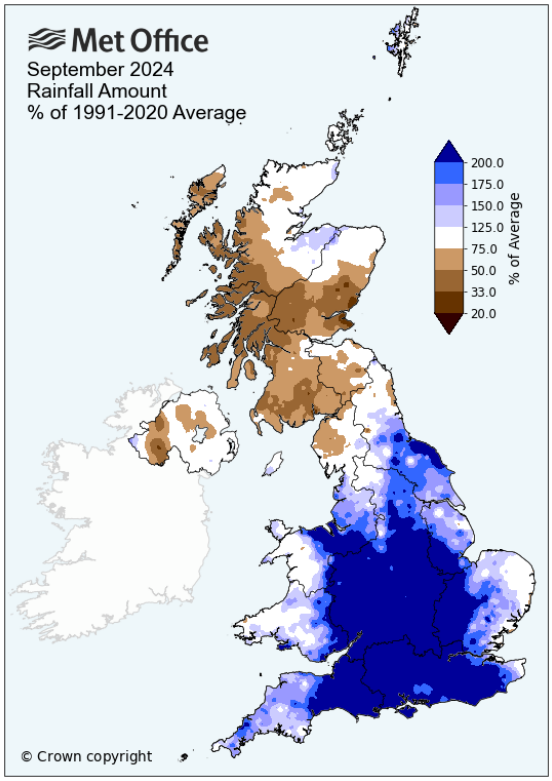
Monthly maps

These maps show monthly average daily maximum, monthly average daily minimum and monthly mean temperature and monthly rainfall for September 2024 as anomalies relative to the September 1991-2020 long term average.

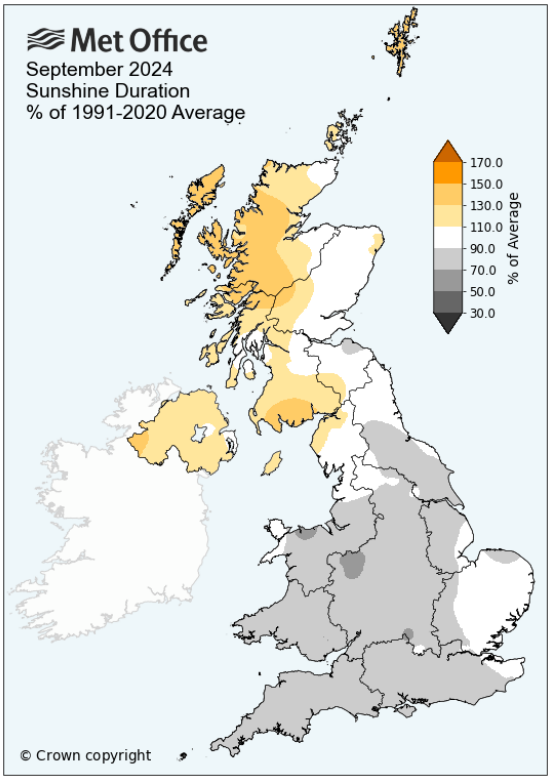


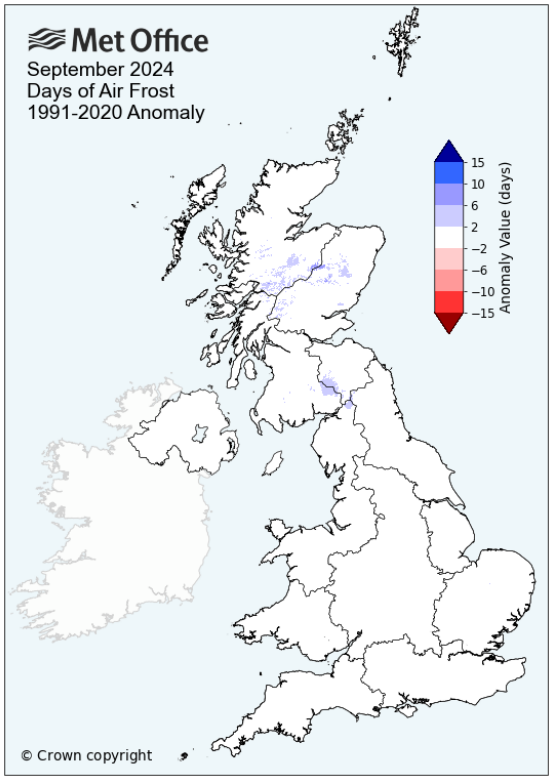


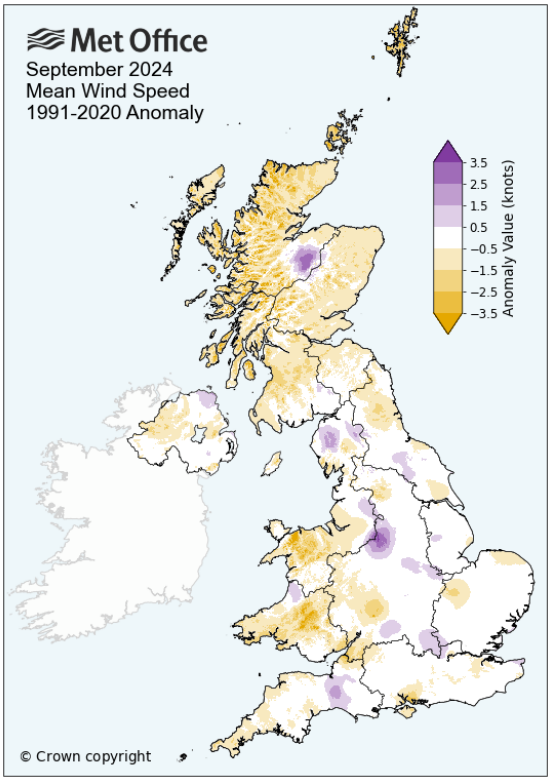


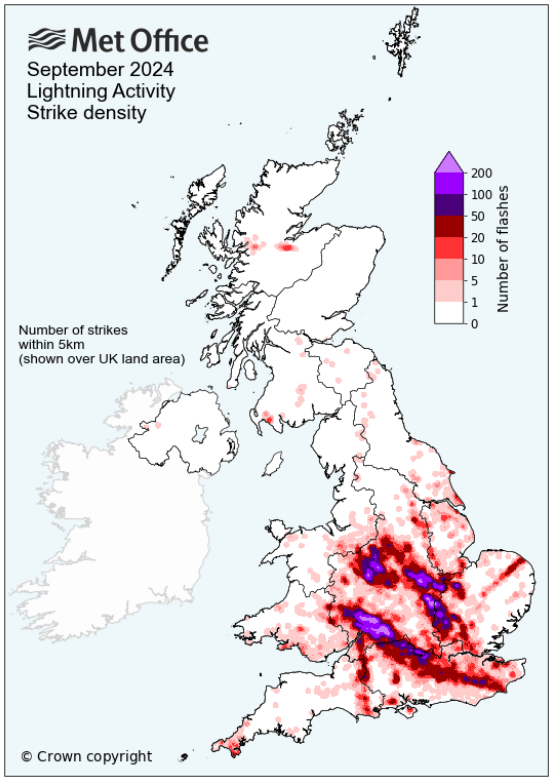


These maps show monthly sunshine, monthly air frost and monthly windspeed for September 2024 as anomalies relative to the September 1991-2020 long term average, plus a map showing lightning activity as the number of strikes within a 5km radius of any land location.









Monthly climate statistics - actuals and anomalies

These tables show the UK and national climate statistics for September 2024 for max, min and mean temperature, rainfall, sunshine and windspeed as actual values and anomalies relative to the September 1991-2020 long term average. The position of the value within the full series (in both ascending and descending order) is shown in the two 'Rank' columns. Central England Temperature (CET) and England & Wales Precipitation (EWP) are also included.

Mean maximum temperature

Region	Maxtemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	16.4	-0.4	66	76	141
England	17.6	-0.5	65	77	141
Wales	16.1	-0.8	77	65	141
Scotland	14.5	-0.3	52	90	141
Northern Ireland	15.9	-0.4	61	81	141
Central England	17.8	-0.4	59	89	147

Mean minimum temperature

Region	Mintemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	8.9	-0.1	45	97	141
England	10.0	0.3	21	121	141
Wales	9.5	0.2	32	110	141
Scotland	7.0	-0.9	84	58	141
Northern Ireland	8.5	-0.4	64	78	141
Central England	10.3	0.1	40	108	147

Mean temperature

Region	Meantemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	12.7	-0.3	56	86	141
England	13.8	-0.1	45	97	141
Wales	12.8	-0.3	60	82	141
Scotland	10.7	-0.6	69	73	141
Northern Ireland	12.1	-0.4	70	72	141
Central England	14.0	-0.2	101	266	366

Rainfall

Region	Rainfall (mm)	% of 1991-2020 Average	Rank - wettest	Rank - driest	Series length (yrs)
UK	114.1	125	43	147	189
England	133.5	195	7	183	189
Wales	155.2	139	37	153	189
Scotland	78.1	63	156	34	189
Northern Ireland	71.6	82	130	60	189
EWP (England and Wales)	154.3	203	7	253	259

Sunshine

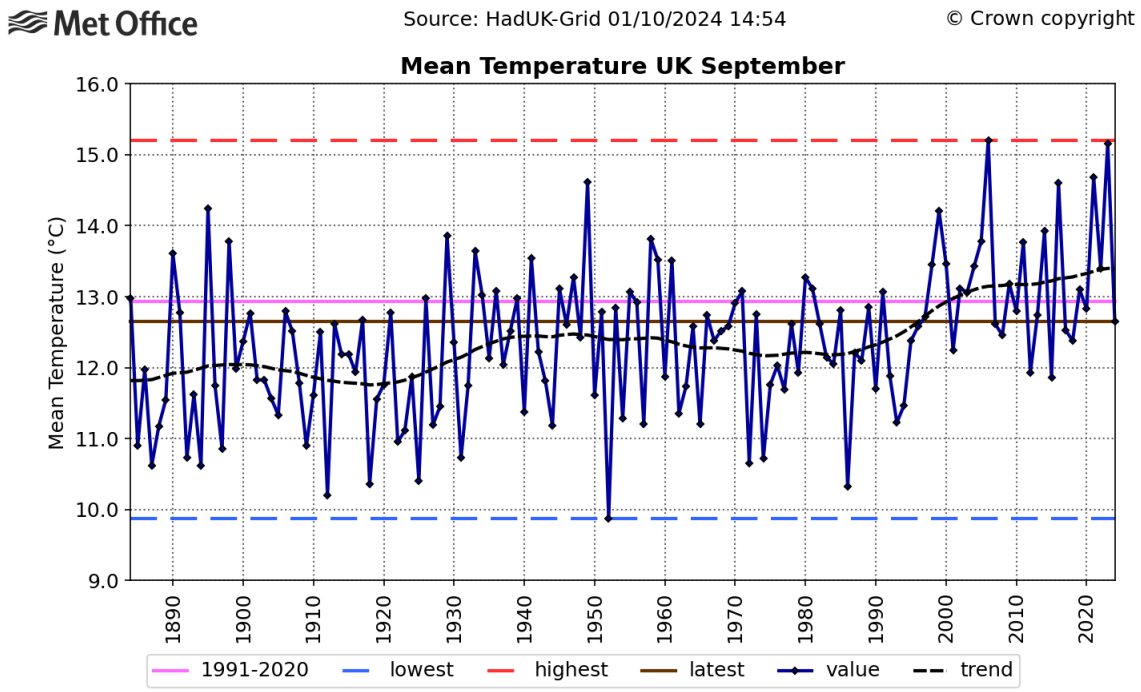
Region	Sunshine (hours)	% of 1991-2020 Average	Rank - sunniest	Rank - dullest	Series length (yrs)
UK	122.7	96	54	62	115
England	122.6	87	77	39	115
Wales	104.8	81	88	28	115
Scotland	125.7	118	9	107	115
Northern Ireland	132.5	117	15	101	115

Windspeed

Region	Windspeed (knots)	1991-2020 Anomaly (knots)	Rank - windiest	Rank - calmest	Series length (yrs)
UK	7.9	-0.5	44	13	56
England	7.4	-0.1	37	20	56
Wales	7.8	-1.1	46	11	56
Scotland	8.8	-1.1	45	12	56
Northern Ireland	7.4	-0.3	44	13	56

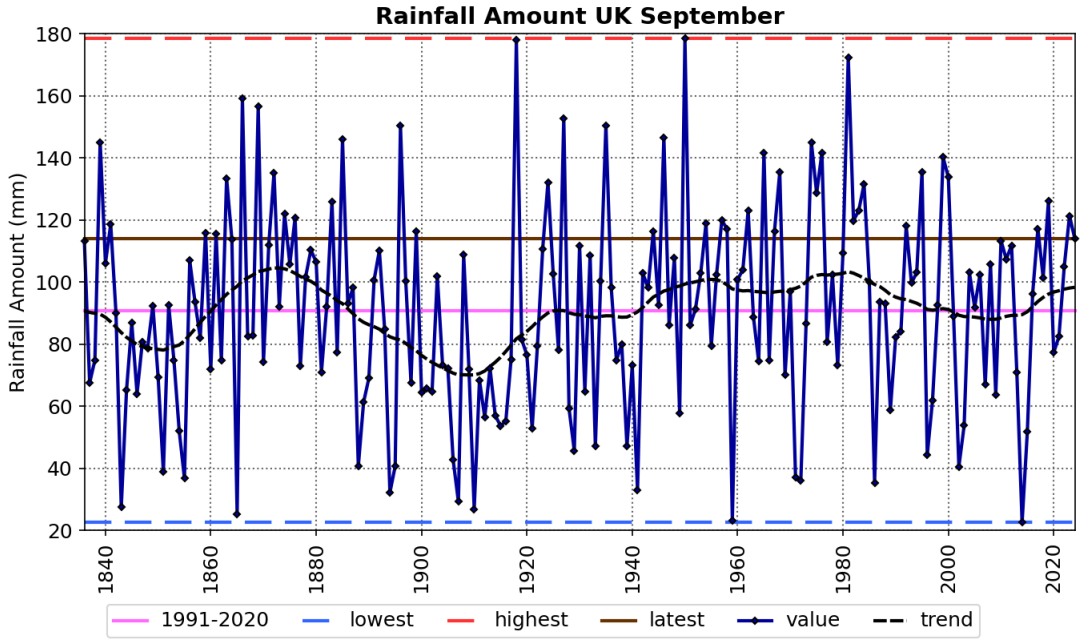
Monthly time-series

These charts show time-series for the UK for September for monthly mean temperature (from 1884), monthly rainfall (from 1836) and monthly sunshine (from 1919). The brown line shows the latest (2024) value. The hatched black line is a smoothing filter which shows the long-term trend. The tables below show statistics for the latest year, latest 10 years 2015-2024, the most recent 30-year climate reference period 1991-2020 and the 30-year baseline climate reference period 1961-1990.



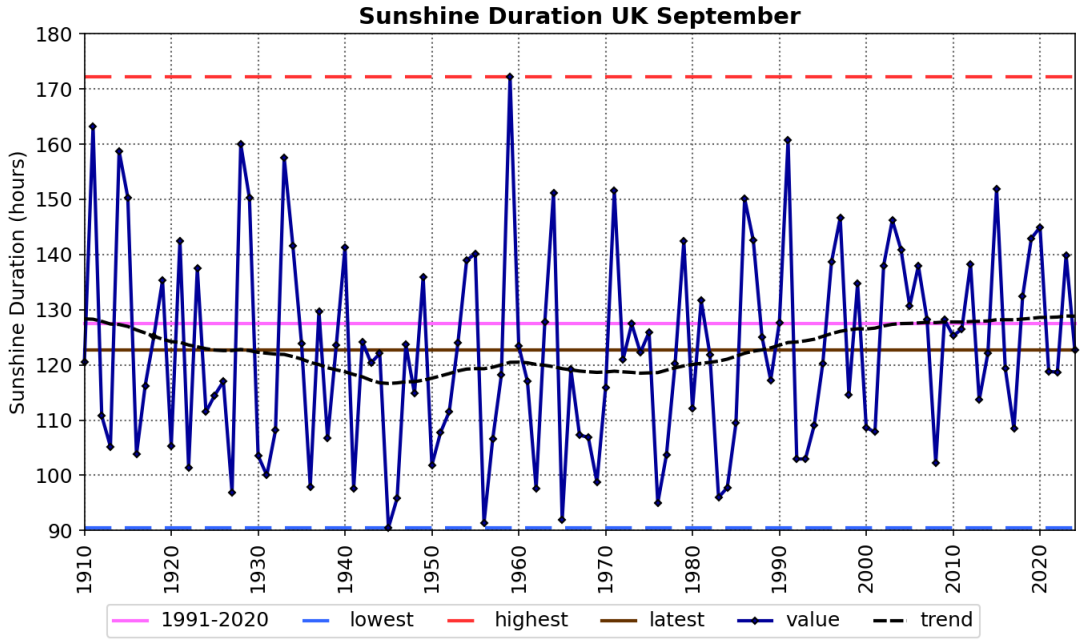
Period	1961-1990	1991-2020	2015-2024	2024
Meantemp (°C)	12.2	12.9	13.3	12.7

Met Office Source: HadUK-Grid 01/10/2024 14:54 © Crown copyright



Period	1961-1990	1991-2020	2015-2024	2024
Rainfall (mm)	99.2	90.9	99.3	114.1

Met Office Source: HadUK-Grid 01/10/2024 14:54 © Crown copyright

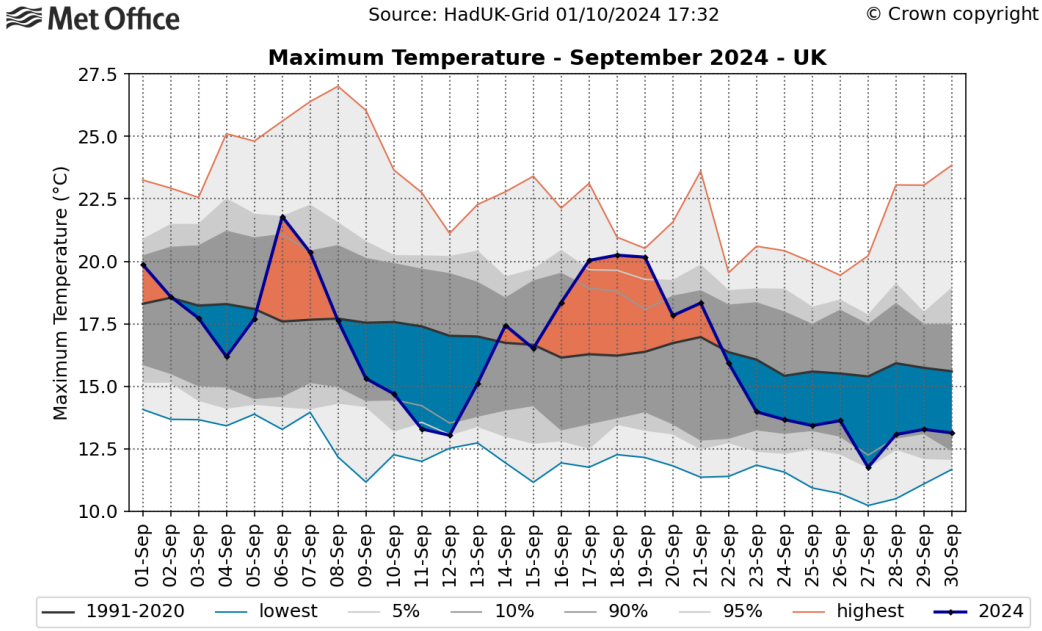


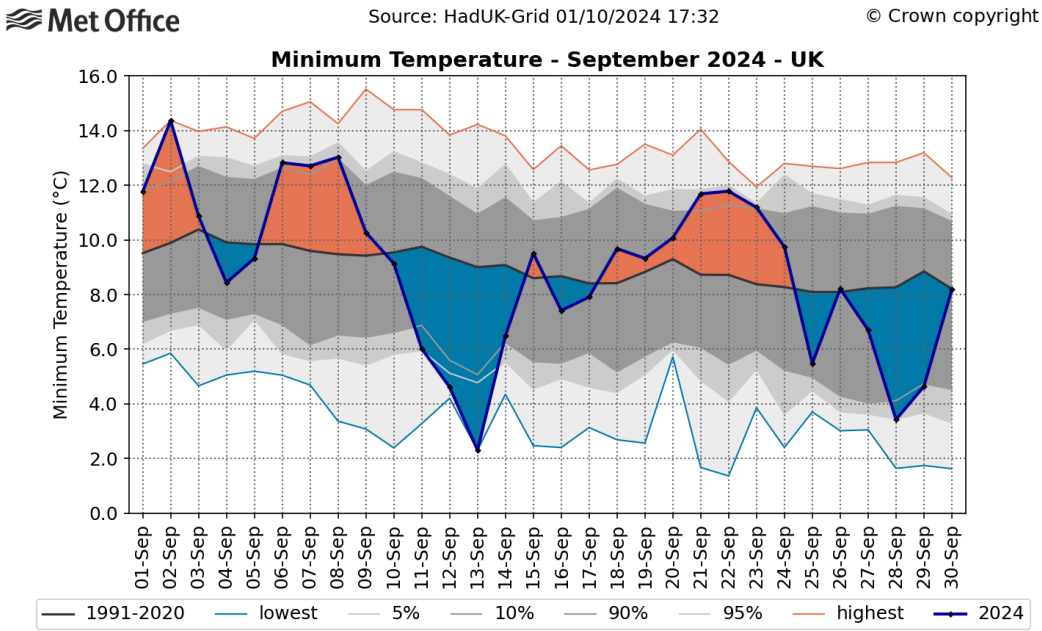
Period	1961-1990	1991-2020	2015-2024	2024
Sunshine (hours)	119.2	127.5	130.0	122.7

Daily time-series

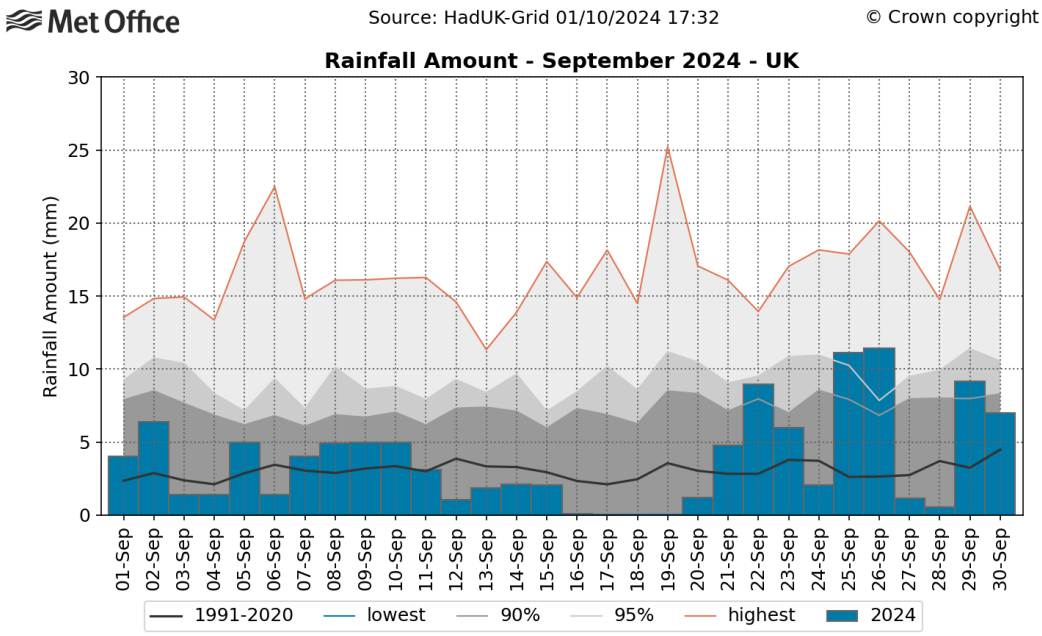
These charts show time-series of UK area-average daily maximum and daily minimum temperature and daily rainfall for each day of September 2024. The areas shaded in grey show the highest and lowest values in the daily temperature series (from 1960) and daily rainfall series (from 1891) together with percentiles and the 1991-2020 long term averages for each day. The rainfall accumulation chart shows the daily rainfall series as an accumulation through the month.

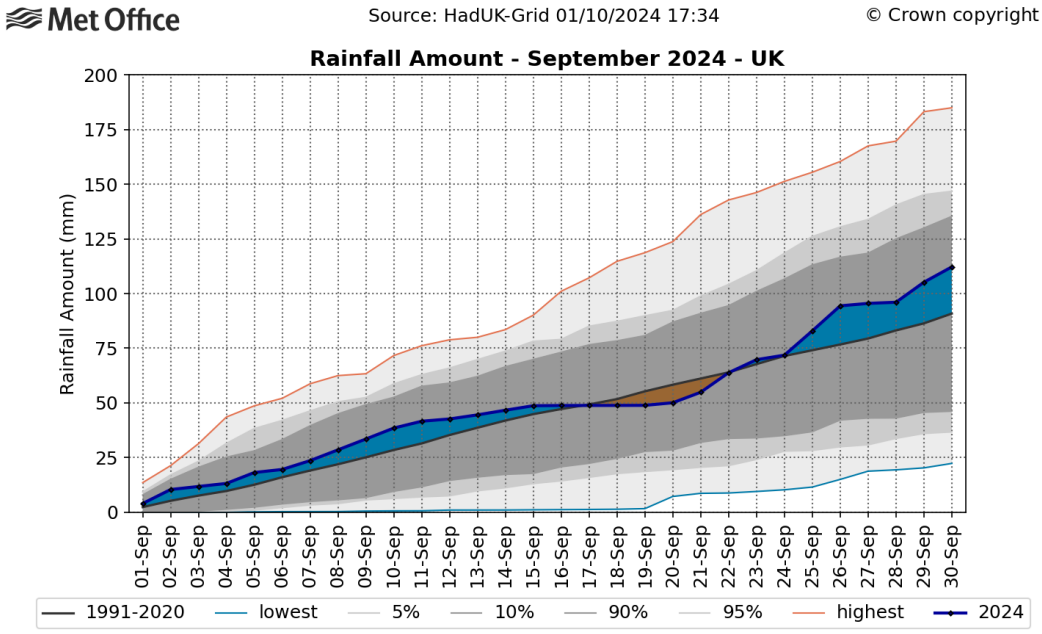
Daily maximum and daily minimum temperature





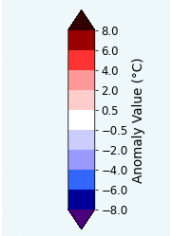
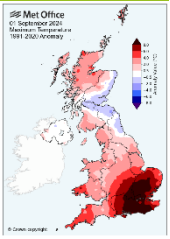
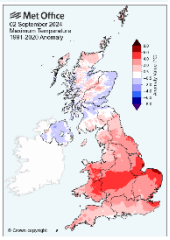
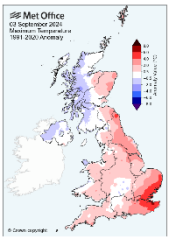
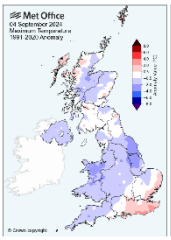
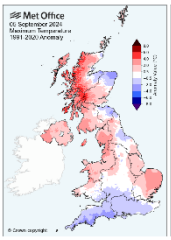
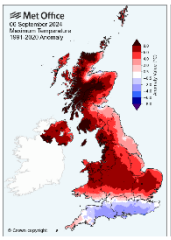
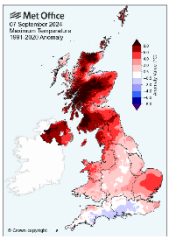
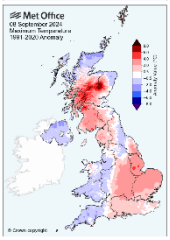
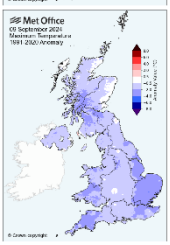
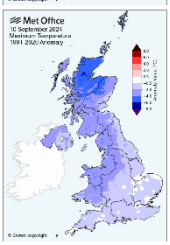
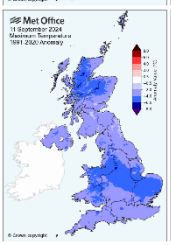
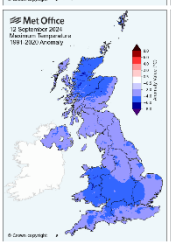
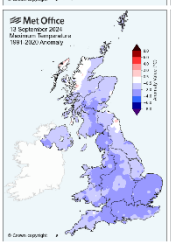
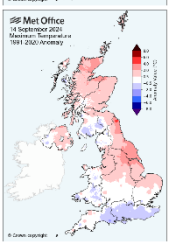
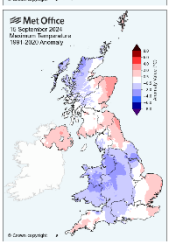
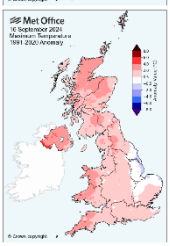
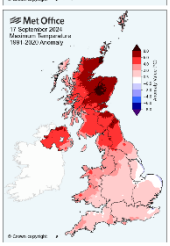
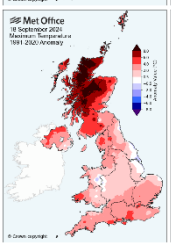
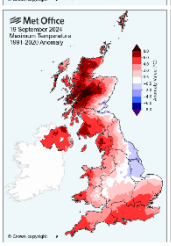
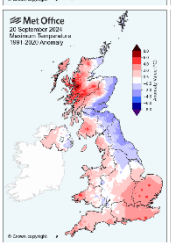
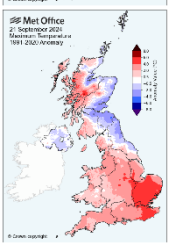
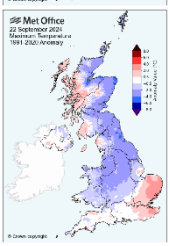
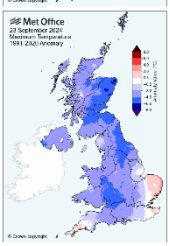
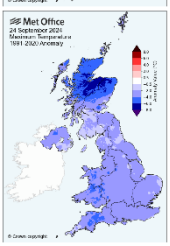
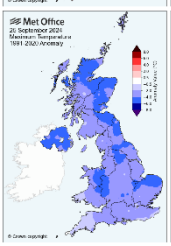
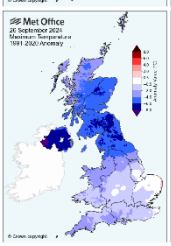
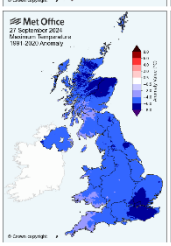
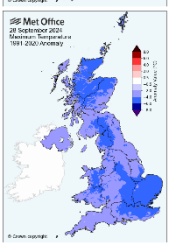
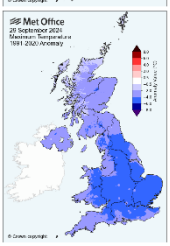
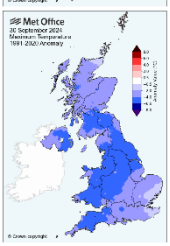
Daily rainfall and rainfall accumulation





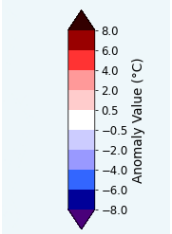
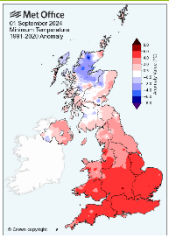
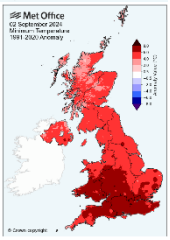
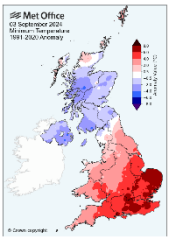
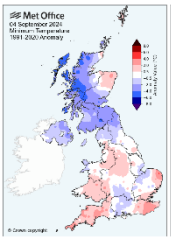
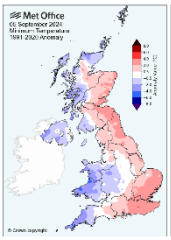
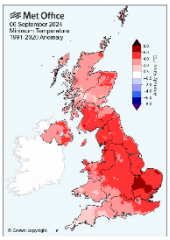
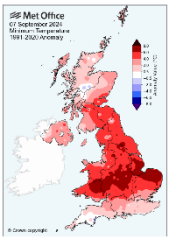
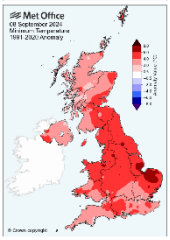
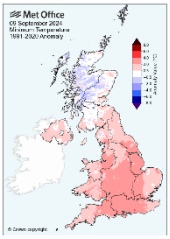
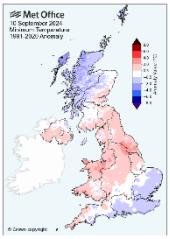
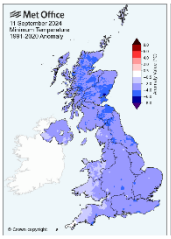
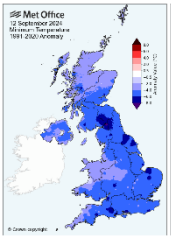
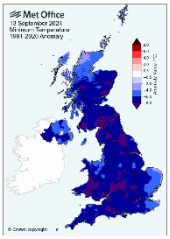
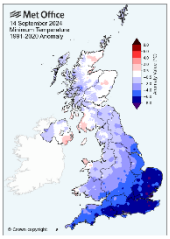
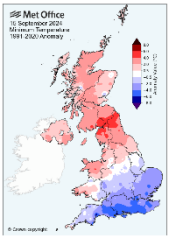
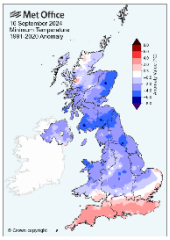
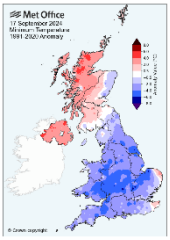
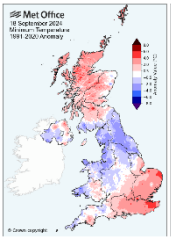
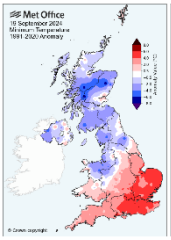
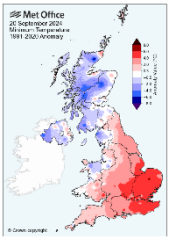
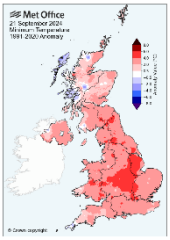
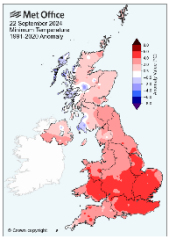
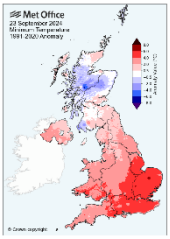
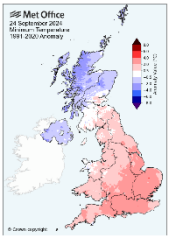
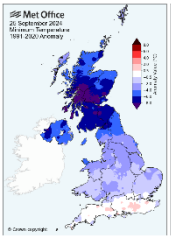
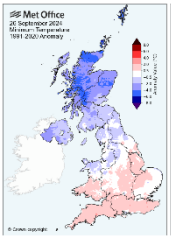
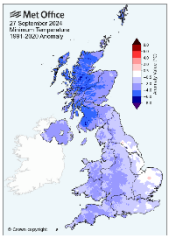
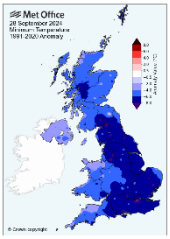
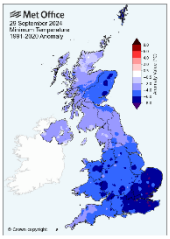
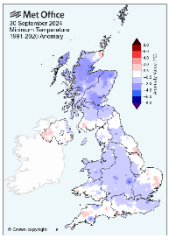
Daily maximum temperature maps - calendar view

These maps show daily maximum temperatures for each day of September 2024 as anomalies relative to the September 1991-2020 long term average. The daily maximum temperature is the maximum from 0900UTC on the day in question to 0900UTC the following day. Normally, the maximum occurs in the early afternoon.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						
						
						
						
						
						

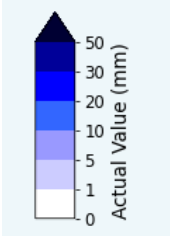
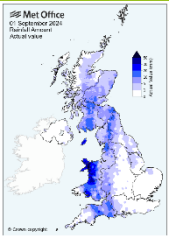
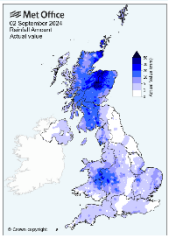
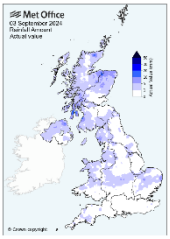
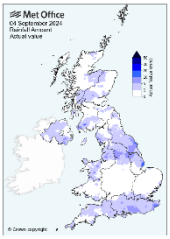
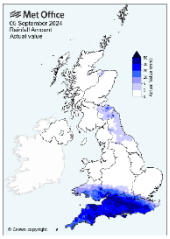
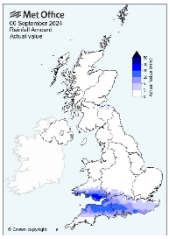
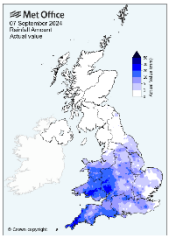
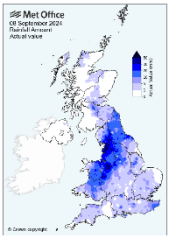
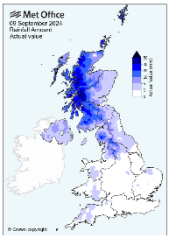
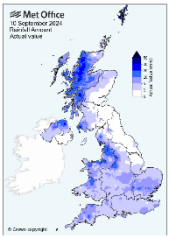
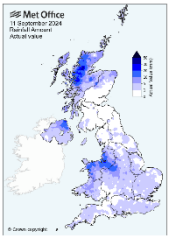
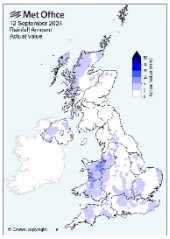
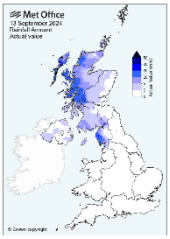
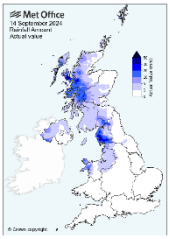
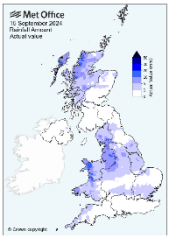
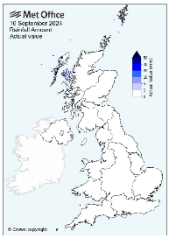
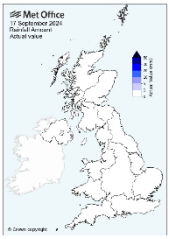
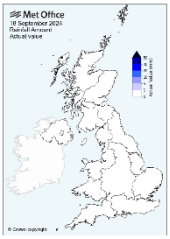
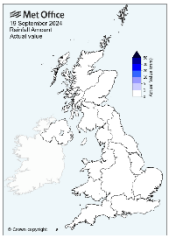
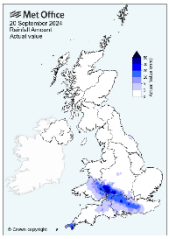
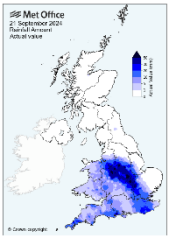
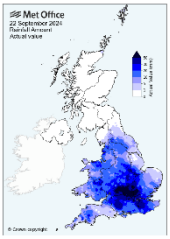
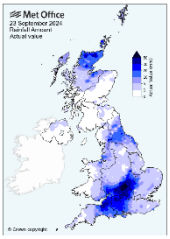
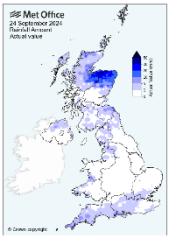
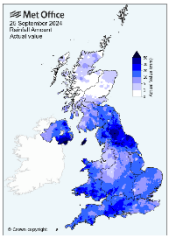
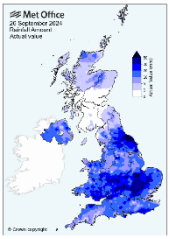
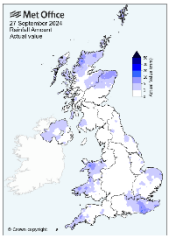
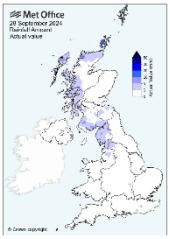
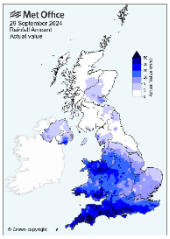
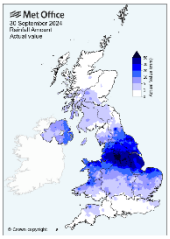
Daily minimum temperature maps - calendar view

These maps show daily minimum temperatures for each day of September 2024 as anomalies relative to the September 1991-2020 long term average. The daily minimum temperature is the minimum from 0900UTC the previous day to 0900UTC on the day in question. Normally, the minimum occurs in the early morning.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
						
						
						
						
						
						

Daily rainfall maps - calendar view

These maps show daily rainfall for each day of September 2024 as daily totals. The daily rainfall is the total from 0900UTC on the day in question to 0900UTC the following day.

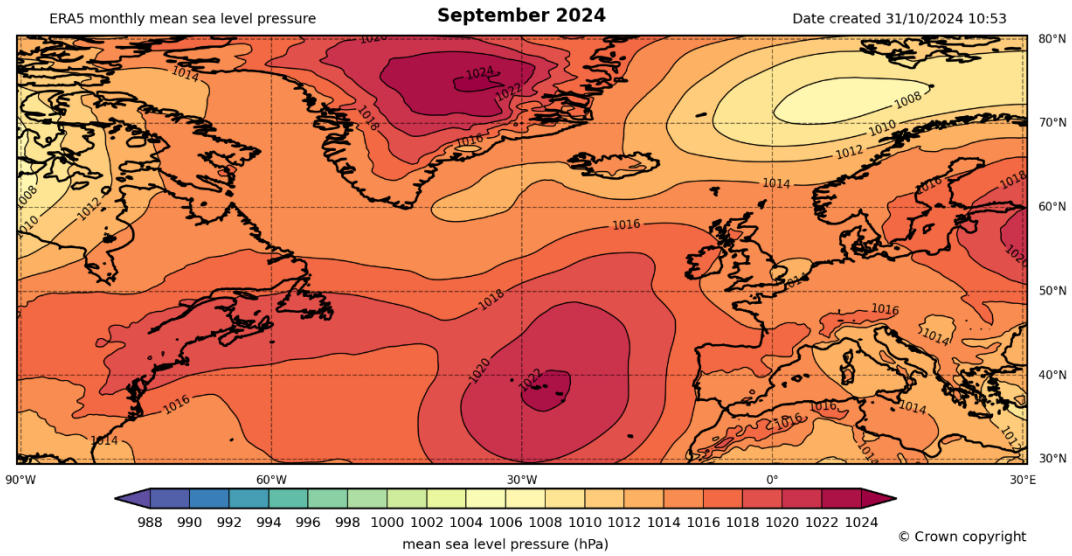
Mon	Tue	Wed	Thu	Fri	Sat	Sun
						
						
						
						
						
						

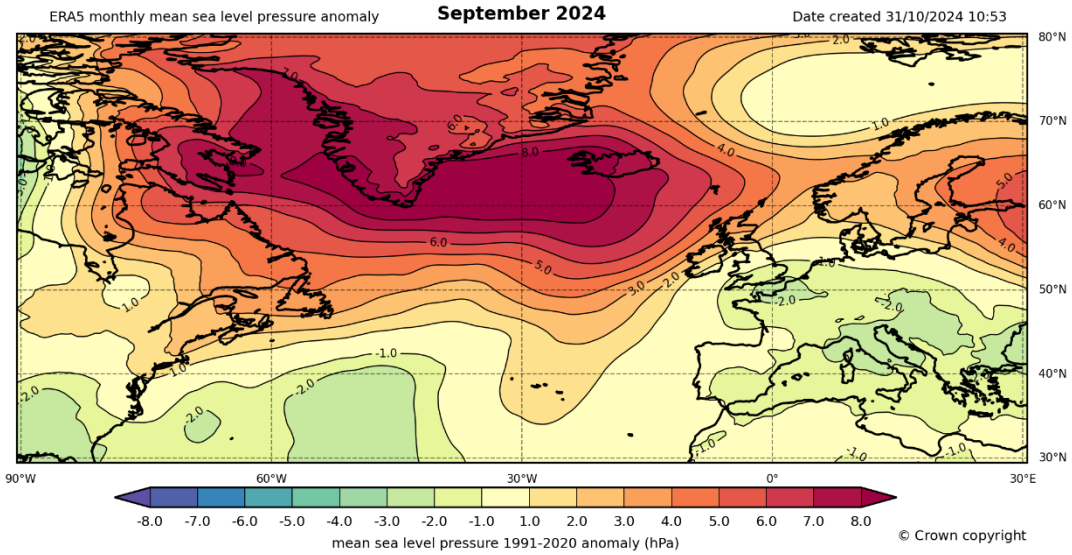
Monthly atmospheric circulation

Mean sea level pressure

These charts show the monthly mean sea level pressure for September 2024 for the UK and north Atlantic, based on the ERA5 reanalysis (Hersbach et al, 2019), both as actual values and as an anomaly relative to the September long term average. These charts provide an indication of the weather characteristics of the month overall i.e. whether the weather type has been generally settled (high pressure) or unsettled (low pressure) during the month.

Anomalously high pressure over Greenland and Iceland led to higher pressure over northern parts of the UK than would typically be expected.

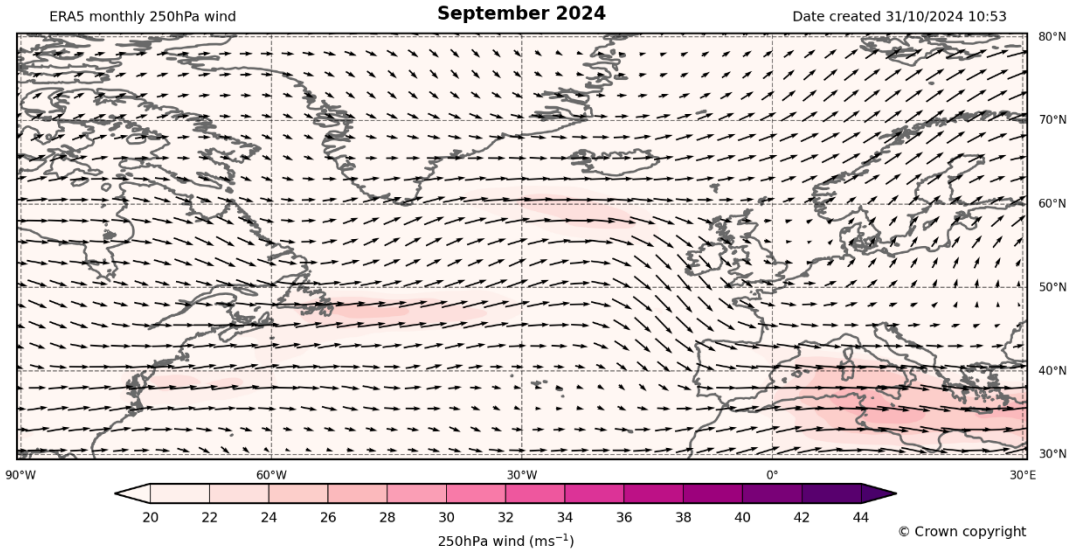


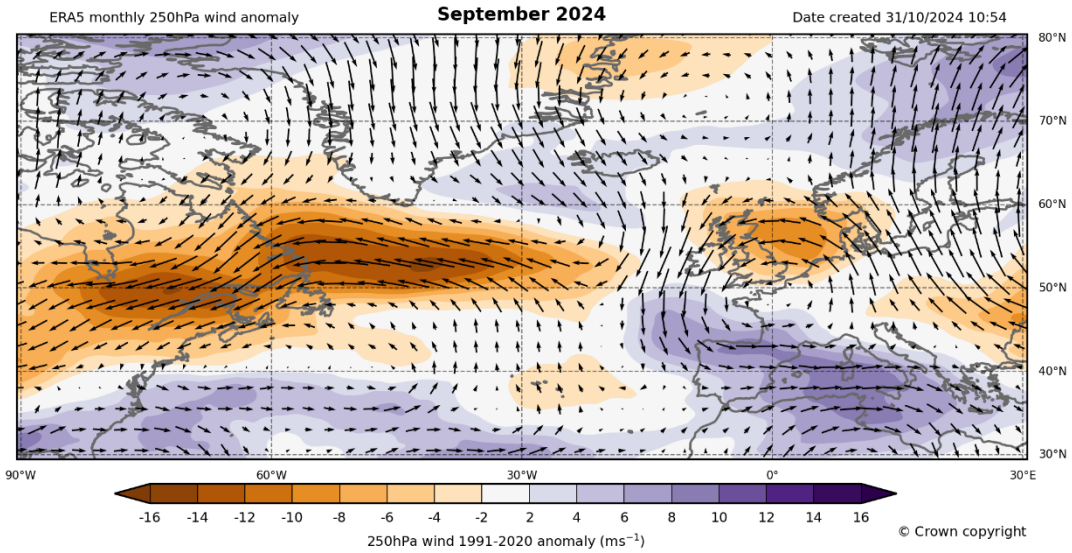


250hPa wind speed and direction

These charts show the monthly 250hPa wind speed and direction for September 2024 for the UK and north Atlantic, based on the ERA5 reanalysis (Hersbach et al, 2019), both as actual values and as an anomaly relative to the September long term average. This provides an indication of the mean strength and position of the jet stream compared to normal. The wind anomaly map shows shaded (scalar) wind speed anomalies with arrows as (vector) wind anomalies.

The jetstream in September was weaker than usual and shifted further south than would typically be expected. There was anomalous easterly flow to the east of the UK.





Weather diary

- **A month of contrasts. Very warm and sunny early, record breaking rainfall**

  High pressure, noticeable by its absence during the summer months, made a brief appearance at the end of August before moving away north on the 1st, not only taking the very warm late summer temperatures with it, high 20s Celsius in the south and east, 30.1deg C in Cambridge, but also allowing the first of many depressions to influence the weather over the UK. There was significant rainfall recorded between the 1st and 3rd, with places in the north and west experiencing daily totals between 30 and 40mm.

  By the 5th, an easterly airflow had become established over the country thanks to a large Scandinavian anti-cyclone. As the European continent is still warm at this time of year, temperatures over the UK began to climb again, reaching the high 20s Celsius for central and western counties, cooler in the east thanks to the influence of a cool North Sea and the south due to a weather front associated with a low pressure system in northern France. This system made slow progress north and by the 8th was producing some significant rainfall over northern England and Wales with totals between 40 and 55mm being reported. This continued through the 9th and from the 10th to the 12th, the UK found itself under the influence of a cool and showery northerly airstream and any significant rainfall confined to northern Scotland.

  High pressure made a welcome return on the 13th and influenced the weather across the UK in one way or another until the 21st. Any Atlantic frontal systems were either pushed over northern England and Scotland or weakened as they progressed south over the UK as a whole. Clear nights led to frosts in all regions on the 13th, with daytime temperatures recovering into the low 20s Celcius especially in southern England from the 15th onwards. By the 18th, the high pressure had settled over southern Scandinavia, resulting in a warm easterly affecting the UK. Temperatures now hit the mid-20s Celcius away from the east coast.

  Central and southern England experienced a significant thundery breakdown on the 22nd, with showers and thunderstorms producing some large rainfall totals in a short space of time, and parts of Bedfordshire, Oxfordshire, Gloucestershire and Surrey recording record daily totals. The showers and thunderstorms continued through the 23rd, only to be replaced by a series of deep Atlantic depressions up to the 27th. One such depression on the 25th brought particularly heavy rainfall to southeastern Northern Ireland with Trassey in Down reporting 110mm.

  A ridge of high pressure brought a brief respite on the 28th before yet another significant area of low pressure approached the UK from the southwest approaches on the 29th producing some strong winds and yet more huge rainfall totals over southern England and south Wales. Winds touched 70mph on the south coast and rainfall totals in excess of 100mm in parts of

Cornwall. The wet conditions moved north overnight on the 29th into the 30th, with daily rainfall totals hitting between 40 and 60mm over northern England.

Notes

The Met Office National Meteorological Library and Archive holds a near-continuous record of monthly weather reports from 1884, and this report forms a continuation of that series. The purpose of each report is to provide an overview of the weather conditions across the UK for that month. The emphasis is mainly based on observations from the surface network of weather stations. Climate series based on from data from these stations are used to provide long term context.

This summary was produced on 17/01/2025 10:15. The statistics are a provisional assessment of the observational data available at the time of production. Ongoing data receipt and quality assurance processes may result in subsequent updates to the statistics presented.

If you have any questions or feedback about this product, spot any data errors or omissions, or wish to obtain further data, please contact the Met Office.

For historical monthly weather reports please visit the Library and Archive.

- The land-surface observations presented in this report are from the Met Office official weather station network which includes both automatic weather stations and manual climate stations operated by volunteer observers. Rainfall data are from the official registered rain-gauge network which includes rain-gauges operated by a number of key partners including the Environment Agency, Scottish Environmental Protection Agency and Northern Ireland Water.
- The observations are carefully managed such that they conform to current best-practice observational standards as defined by the World Meteorological Organization (WMO). The observations also pass through a range of quality assurance procedures at the Met Office before application for climate monitoring.
- Daily and monthly maps, monthly statistics and monthly time-series are primarily based on the HadUK-Grid dataset of 1km resolution UK gridded climate data (Hollis et al, 2019). Monthly statistics from the monthly Central England temperature series 1659 (Manley, 1974) and England and Wales precipitation series from 1766 (Wigley et al, 1984) provide long term context.
- The monthly lightning activity map is based on data from the Met Office LEELA (Lightning Electromagnetic Emission Location by Arrival time difference) system. This is an automatic lightning location network comprising around ten lightning outstation sensors located across Europe.
- The monthly maps of mean sea level pressure and 250hPa wind speed and direction are based on the ERA5 reanalysis (Hersbach et al, 2019). ERA5 is the fifth generation ECMWF reanalysis for the global climate and weather for the past 4 to 7 decades. Reanalysis combines model data with observations from across the world into a globally complete and consistent dataset using the laws of physics.

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